Agilent J2126/7A

Transmission Test Sets

Quick Reference Guide

Agilent Technologies

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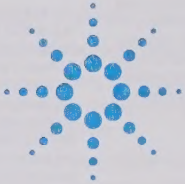

Agilent J2126/7A Transmission Test Sets

Quick Reference Guide

Agilent Technologies

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In This Quick Reference Guide...

This guide contains information on:

- The conventions used within this guide.
- A Getting Started chapter for new users.
- An introduction to using the Graphical User Interface (GUI), including information on the display windows, the menus and basic GUI operations.
- An introduction to using Online Help, including information on how to add and use your own help files.
- An introduction to using and selecting Multiple Instruments.
- Using Smart Test and SignalWizard, the quick and easy way to set up and use the instrument.
- Some tips on avoiding problems when making measurements.
- Quick reference tables listing the front panel settings to rapidly select major instrument functions.

CAUTION

A **CAUTION** notice denotes a hazard. It calls attention to an operating procedure, practice, or the like that, if not correctly performed or adhered to, could result in damage to the product or loss of important data. Do not proceed beyond a **CAUTION** notice until the indicated conditions are fully understood and met.

WARNING

A WARNING notice denotes a hazard. It calls attention to an operating procedure, practice, or the like that, if not correctly performed or adhered to, could result in personal injury or death. Do not proceed beyond a WARNING notice until the indicated conditions are fully understood and met.

Conventions Used in This Guide...

- Front panel buttons appear in bold within angled brackets. For example, press **<Menu>**.
- When buttons are connected by a plus (+) sign, for example, **<2>** + **<4>**, press the listed buttons in sequence.
- Menu items appear in bold. The greater than (>) symbol separates each menu level. For example, '**Test Functions > Errors and Alarms**' indicates that you should choose 'Errors and Alarms' from the 'Test Functions' main menu.
- Field items and drop down list entries appear in **bold**. For example, 'select **Signal Rate** field and choose **OC-3** from the drop-down list'.
- This Guide applies to both SONET and SDH network standards. Where there is a difference in the terminology used between these two standards, the SONET version is given first.

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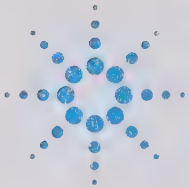

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Product Description

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Introduction

The instrument provides all the test capability you need to install and verify the performance of today's high-capacity transmission systems and networks in one portable package.

In addition, there is an Ethernet module that can fully test the data capabilities of the new generation of multi-service network elements.

SONET/SDH Capability

- Global test coverage (SONET, SDH, PDH and T-Carrier).
- Full integrated all-rate testing:
  - 52 Mb/s to 10 Gb/s optical.
  - 52/155 Mb/s; DS1/3; 2/8/34/140 Mb/s electrical.
- Full range of standard and concatenated mappings.
- All standard error and alarm measurements, plus:
- optical power, electrical level, pulse mask, frequency.
- service disruption time, pointer movements, delay.
- Simultaneous all-channel testing (up to 192 STSs/AUs).
- Intrusive and non-intrusive Thru-mode.
- Comprehensive SONET/SDH overhead testing.
- Electrical interfaces
- (DS1/3; 2/8/34/140 Mb/s; 52/155 Mb/s)

- VT/TU payload testing
- DS1/3 and 2/34/140 Mb/s service mappings
- DSn and PDH (En) testing
- Pulse mask testing (up to 52 Mb/s electrical)
- Service disruption measurement
- Round trip delay measurement
- Electrical level measurement
- Graphical error and alarm result displays
- G.821, M2100, M2101, M2101.1, M2110, M.2120 performance analysis
- Fast access to key measurement tasks using Smart Test.
- Line and payload frequency offset.
- Transmit and Receive can be independently configured.
- Broad range of graphical results tools.
- Comprehensive online help facilities:
  - Online User manual.
  - Context-sensitive help for each control field.
  - Ability to add your own help documents.

Ethernet Capability

- Test data services at Layer 1 and Layer 2
- Multi-port testing - 8x10/100 Mb/s and 2x1 Gigabit Ethernet
- Simultaneous operation of all ports
- Simultaneous SONET/SDH and Ethernet operation
- Extremely simple to set-up and operate
- Hot-swap GBIC modules for wavelength choice
- Automated RFC 2544 benchmark testing
- Full rate traffic generation and reception
- Can be used for end-to-end or loopback testing
- Unique "Loopthru" mode allows loopback testing even at Layer 2

- Measure the "Transmission" elements of Ethernet:
  - Throughput
  - Latency
  - Frame Loss
  - Errors
- User selectable full/restricted/fixed auto negotiation
- User selectable VLAN/priority tagging and flow control
- Frame capture facility
- Comprehensive online help facilities:
  - Online User manual
  - Context-sensitive help for each control field
  - Ability to add your own help documents

Option Guide

There are three mainframes:

- J2126A - 3-slot chassis.
- J2127A - 4-slot chassis.
- J2127A - 6-slot extended chassis.

Mainframe and Potential Test Rate Capability

Mainframe	Optical Test Interfaces	Frequency Range
J2126A (see Note 1)	OC-1, OC-3, OC-12, OC-48 STM-0, STM-1, STM-4, STM-16	52 Mb/s to 2.5 Gb/s
J2127A (see Notes 1, 2 and 3)	OC-1, OC-3, OC-12, OC-48, OC-192 STM-0, STM-1, STM-4, STM-16, STM-64	52 Mb/s to 10 Gb/s

1. With option 103 fitted, maximum line rate restricted to OC-12/STM-4.

2. Can be configured with maximum line rate of OC-48/STM-16 and later upgraded to OC-192/STM-64.

3. Can have a 4-slot chassis or extended (6-slot) chassis.

Optical Interfaces

	Tx Optical Wavelength	Option
Optical interfaces operating up to 2.5 Gb/s	1310 nm	100
	1550 nm	101
	1310/1550 nm	102
Optical interfaces operating up to 10 Gb/s	1550 nm	111(HS*), 121 (SR**)
	1310 nm	120 (SR**)

* HS - High Rx sensitivity optics.

** SR - Short reach optics.

Optical Connectors (product options)

Connector	Option
FC/PC Adapters fitted on all optical interfaces	190
SC Adapters fitted on all optical interfaces	191
ST Adapters fitted on all optical interfaces	192

Alternative Optical Connectors (available accessories)

Alternative optical connectors are available for your product, order the appropriate J7283A (FC/PC), J7284A (SC) or J7285A (ST) accessory (connector). The number of connectors required for your product is shown below.

	J7283A (FC/PC)	J7284A (SC)	J7285A (ST)
J2126A with option 100/101	2	2	2
J2126A with option 102	3	3	3
J2127A* with option 100/101 and 111/120/121	5	5	5
J2127A* with option 102 and 111/120/121	6	6	6

* Can have a 4-slot chassis or extended (6-slot) chassis.

Ethernet Options

	Option
Ethernet testing (8 x 10/100 Mb/s; 2 x 1 Gb/s)	323
1000Base-SX (850 nm) GBIC modules (two)	325
1000Base-LX (1310 nm) GBIC modules (two)	326

Other Options

Certificate of Calibration

Option UK6: Calibration certificate with test data.

Warranty and Service Plans

Terms and conditions of the applicable warranty for this product are contained in the sales and related documentation supplied separately.

Please contact your nearest Agilent Technologies Sales Office for further information on warranty and extended warranty options.

For access to Agilent Product information and sales/service contacts, please visit:

http://www.agilent.com

Accessories

Additional Documentation

J7280A: Full set of printed manuals:
User Guide
Quick Reference Guide
Remote Control Manual
Installation and Verification Manual

Carrying Cases

J7286A: Hard transit case (for J2126A).

J7287A: Hard transit case (for J2127A).

J7288A: Soft carrying case (for J2126/7A).

J7289A: Hard transit case (for J2127A 6-slot extended chassis).

J7290A: Soft carrying case (for J2127A 6-slot extended chassis).

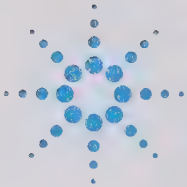
Optical Adapters and Cables

J7283A: FC/PC optical connector (exchangeable)

J7284A: SC optical connector (exchangeable)

J7285A: ST optical connector (exchangeable)

J7281A: DCC port converter cable: 9-pin miniature D-type to 37-pin D-type (RS-449, female)



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Getting Started

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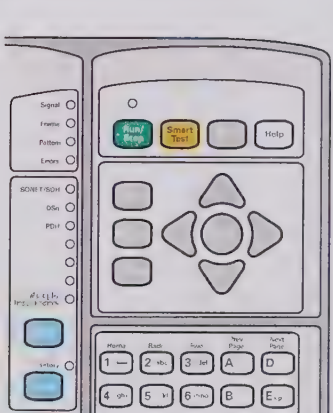
This chapter guides you round the many features of the instrument. It also includes information on how to chose the network standard (SONET or SDH) for the instrument.

Front Panel Tour



Function Controls

Run/ Stop	Press this button to start a new test period or terminate the current test period. The LED indicator above the button is on when a test period is in progress.
Smart Test	Press this button to access the Agilent Smart Test menu. Operates on the foreground instrument.

Press this button to add a single error to the transmitted signal. The type of error added is selected on the **Test Functions > Errors and Alarms** page. Operates on the foreground instrument.

Press this when you need to refer to the online help. Press it again to take you back to the instrument display.

Navigation Controls

The **<Arrow Navigation>** buttons move the focus up/down/left/right through menus, drop-down lists and the instrument display.

Press **<Select>** to enter any selected menu item or value you have entered into a field.

Press **<Menu>** to display the main menu for the current application.

Press **<Menu>** again, or press **<Cancel>**, to close the menu.

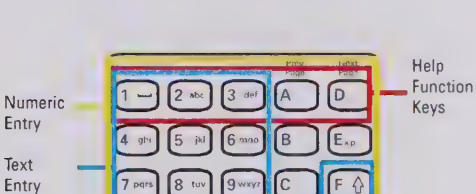
Press **<Window>** to change the focus between the left and right windows.

<Cancel> will close any menu or drop down list without making any changes.

Keypad

The keypad provides quick text and numeric entry. Some keys are also used for navigation in the online help system.

The operation of the keys depends on the mode of operation for the current entry field.



Numeric Entry

In a numeric entry field, enter the number you want using the keypad. Decimal, binary and hexadecimal entries are all made directly from the keypad.

Special keys used in numeric entries:

— +	Press **<Minus>** to enter a negative value, for example for a frequency offset of -99.9 ppm, press: **< - > + <9> + <9> + < . > + <9>**
X	Press **< X >** for 'don't care' entries.
Exp	Use this key to enter an exponent, for example for an error rate of 9.9E-9 press: **<9> + < . > + <9> + <Exp> + < - > + <9>**
⇦	To edit a number press the **<Left Arrow>** key for backspace operation deleting preceding entry.

Text Entry

In a text entry field, for example when editing a trace message, the keypad will be in text mode.

You enter text in the same way as you would enter text into a cell phone. The keys are labelled "abc2ABC", "def3DEF" and so on. Press the key with the character you want: once for the first character, twice (pressing the key quickly in succession) for the second and so on.

To enter numbers or upper case letters quickly, use the **<F/up arrow>** key to switch between lower case characters (CapsOff), upper case (CapsOn) and number (Num). The current mode is displayed in the Status Line at the bottom right of the screen.

Special keys used in text entries:

This key switches between upper and lower case characters and numbers. The current mode, either "Caps" or "Num" - is displayed at the bottom right of the screen on the Status Line.

Press this key for these special characters:

space _ NUL LF CR

Press this key for these math symbols

- + / * = < > % ^

Press this key for these miscellaneous symbols

@ # 0 $ \ & ~ ( ) [ ] { }

Press this key for these punctuation symbols

. ? ! , : ; " ' '

Help Function Keys

These keys are used for additional navigation when in Online Help.

Home	Returns you to the Home page.
Back	Takes you back to the previous page.
Fwd	If you have used the **<Back>** key for navigating then this key takes you forward to where you have come from. Otherwise, pressing this key has no effect.
Prev Page	Scrolls up through the displayed page.
Next Page	Scrolls down through the displayed page.

Print Control

	Press **<Print Control>** to access the print control page. Operates on the foreground instrument.

Status and Alarm LEDs

The Status LED indicators provide information about the status of the instrument's receiver. The Signal, Frame and Pattern indicators are green if the signal is good, and red during an alarm condition. Error indicator is off or red if error detected.

SIGNAL Green: Valid signal (level; data transitions) detected at input. Red: No data transitions detected at input or low optical/electrical power. Operates on the foreground instrument.

FRAME Green: Correct framing detected at all levels of the received signal (on the line signal plus all levels down to the selected test channel). Red: Frame alignment lost at one or more levels of the received signal. Operates on the foreground instrument.

PATTERN Green: Correct detection of expected test pattern. Red: Expected test pattern not received. Operates on the foreground instrument.

ERRORS Red: An error has been detected in the received signal. The indicator remains red for 100 ms, then returns to off. Operates on the foreground instrument.

SONET/SDH: Indicates that at least one SONET or SDH alarm is present. Operates on the foreground instrument.

DSn: Indicates that at least one ANSI DS1, DS2 or DS3 alarm is present. Operates on the foreground instrument.

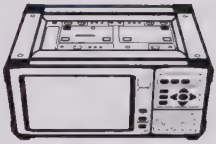
PDH: Indicates that at least one ETSI E1, E2, E3 or E4 alarm is present. Operates on the foreground instrument.

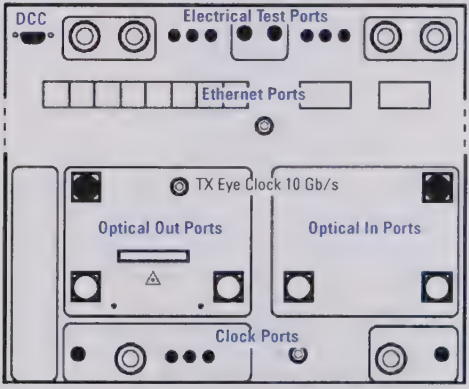
Multiple Instruments: Indicates that an error or alarm has been detected by a background instrument.

History: Press **<Show More>** to view the alarm history. **<Show More>** provides access to the detailed alarm information (both current status and history). If an alarm has occurred during the current test period, the History indicator will be on. Operates on the foreground instrument.

Press **<Reset>** to reset the Alarm History data. The History LED will go off. If an alarm condition is present during the reset, then the LEDs associated with that alarm will remain on after the reset. Resetting of the history data also occurs when you start a new test period. Operates on the foreground instrument.

Top Panel Tour





Optical Out Ports

Provides SONET optical signals OC-1, OC-3, OC-12, OC-48, OC-192, and SDH optical signals STM-0, STM-1, STM-4, STM-16, STM-64 at wavelength 1310 and 1550 nm, depending on instrument model and options.

52 Mb/s - 2.5 Gb/s 1310 nm

Selectable optical connector (see "Optical Connectors (product options)" on page 13) for a 52 Mb/s to 2.5 Gb/s optical output. Nominal wavelength is 1310 nm. Power output is -5 to +0 dBm.

52 Mb/s - 2.5 Gb/s 1550 nm

Selectable optical connector (see "Optical Connectors (product options)" on page 13) for a 52 Mb/s to 2.5 Gb/s optical output. Nominal wavelength is 1550 nm. Power output is -2 to +3 dBm.

10 Gb/s, 1550 nm

Selectable optical connector (see "Optical Connectors (product options)" on page 13) for a 10 Gb/s optical output. Nominal wavelength is 1550 nm. Power output is -1 to +1 dBm.

10 Gb/s, 1550 nm (SR)

Selectable optical connector (see "Optical Connectors (product options)" on page 13) for a 10 Gb/s optical output. Nominal wavelength is 1550 nm. Power output is -5 to -1 dBm.

10 Gb/s, 1310 nm (SR)

Selectable optical connector (see "Optical Connectors (product options)" on page 13) for a 10 Gb/s optical output. Nominal wavelength is 1310 nm. Power output is -6 to -1 dBm.

Optical In Ports

Accepts SONET OC-1, OC-3, OC-12, OC-48 and OC-192 and SDH STM-0, STM-1, STM-4, STM-16, STM-64 signals, depending on the model and options fitted.

52 - 622 Mb/s

Selectable optical connector (see "Optical Connectors (product options)" on page 13) for a 52 Mb/s to 622 Mb/s optical input (OC-1, OC-3, OC-12/STM-0, STM-1, STM-4 signals). Wavelength 1200 to 1600 nm. Input damage power >+3 dBm; never exceed maximum input power. The recommended input power operating level for OC-1, OC-3/STM-0, STM-1 signals is -33 to -10 dBm and for OC-12/STM-4 signals -28 to -8 dBm.

2.5 Gb/s

Selectable optical connector (see "Optical Connectors (product options)" on page 13) for a 2.5 Gb/s optical input (OC-48/STM-16 signals). Wavelength 1200 to 1600 nm. Input damage power> +3 dBm; never exceed maximum input power. The recommended input power operating level for OC-48/STM-16 signals is -28 to -8 dBm.

10 Gb/s High Rx Sensitivity Optics

Selectable optical connector (see "Optical Connectors (product options)" on page 13) for 10 Gb/s (OC-192/STM-64) optical input signals. Wavelength 1200 to 1600 nm. Input damage power >+1 dBm; never exceed maximum input power. The recommended input power operating level for OC-192/STM-64 signals is -20 to -9 dBm.

10 Gb/s (SR) Optics

Selectable optical connector (see "Optical Connectors (product options)" on page 13) for 10 Gb/s (OC-192/STM-64) optical input signals. Wavelength 1200 to 1600 nm. Input damage power >+3 dBm; never exceed maximum input power. The recommended input power operating level for OC-192/STM-64 (1310 nm) signals is -11 to -1 dBm. The recommended input power operating level for OC-192/STM-64 (1550 nm) signals is -14 to -1 dBm.

Clock Ports

2 Mb/s, 2 MHz Clock In

BNC 75 ohm (nominal) unbalanced connector for a 2 Mb/s and 2 MHz MTS external clock source input.

2 Mb/s, 2 MHz Clock In

3-pin Siemens connector for a 2 Mb/s and 2 MHz MTS external clock source input.

DS1 Clock In

Bantam 100 ohm (nominal) connector for a DS1 BITS external reference clock input.

2 MHz Clock Out

BNC 75 ohm (nominal) unbalanced connector for a 2 MHz MTS clock reference output. Generated relative to the selected transmit reference clock.

DS1 Clock Out

Bantam 100 ohm (nominal) connector for a DS1 BITS clock reference output. Generated relative to the selected transmit reference clock.

TX Eye Clock 52 - 2.5 Mb/s

SMA connector providing a TX Eye Clock signal (at 1/4 of the line rate) which can be used to trigger an oscilloscope when examining data signals.

TX Eye Clock 10 Gb/s

SMA connector providing a TX Eye Clock signal (at 1/16 of the line rate) which can be used to trigger an oscilloscope when examining data signals.

DCC Port

Connector 9-pin miniature D-type.

Use this port to insert and drop either the D1-D3 DCC channel or the D4-D12 DCC channel. The first bit of data inserted will be put into the MSB of the DCC channel. The MSB of the dropped data bytes will be output first. The transmit (drop) and receive (insert) capabilities are independent, that is the transmit and receive clock rates can be set to different rates. The instrument acts as a DCE (Data Communications Equipment), supplying the clock signal for both drop and insert operation.

Rates D1-D3 DCC: 192 kb/s, D4-D12 DCC: 576 kb/s

Signal Type Unipolar differential signal as defined in ANSI EIA-422-B and EIA-423-B.

Input Termination 100 ohms differential.

Input Sensitivity 500 mV over a +/-15 V common mode range and 200 mV over a +/-7 V range.

Pin Number	RS-449/422 Circuit
1	Rx Data Output (+)
2	Rx Clock Output (+)
3	Signal ground
4	Tx Clock Output (+)
5	Tx Data Input (+)
6	Rx Data Output (–)
7	Rx Clock Output (–)
8	Tx Clock Output (–)
9	Tx Data Input (+)

Electrical Test Ports

SONET/SDH Out

BNC 75 ohm unbalanced connector for an STS-1/STM-0 (B3ZS) or STS-3/STM-1 (CMI) electrical output.

SONET SDH In

BNC 75 ohm unbalanced connector for an STS-1/STM-0 (B3ZS) or STS-3/STM-1 (CMI) electrical input. Input Mode - Terminate or Monitor. Monitor mode conforms to G.772-1993. Monitor Gain - 20 dB.

2 Mb/s Out

3-pin Siemens 120 ohm balanced connector for an E1 Transmit or E1 Drop signal output. Either this port or the 2-140 Mb/s DS3 unbalanced Out port can be active for the E1 Transmit function.

2 Mb/s In

3-pin Siemens 120 ohm balanced connector for an E1 Receive or E1 Insert signal input. Either this port or the 2-140 Mb/s DS3 unbalanced In port can be active for the E1 Receive function.

DS1 Out

Bantam 100 ohm balanced connector for a DS1 Transmit or DS1 Drop output.

DS1 In

Bantam 100 ohm balanced connector for a DS1 Receive or DS1 Insert input.

2-140 Mb/s DS3 Out

BNC 75 ohm unbalanced connector for E1, E2, E3, E4, DS3 transmit or E3, E4, DS3 Drop output signals. Either this port or the 2 Mb/s balanced Out port can be active for E1 Transmit function.

2-140 Mb/s DS3 In

BNC 75 ohm unbalanced connector for E1, E2, E3, E4, DS3 receive or E3 and E4 DS3 Insert input signals. Either this port or the 2 Mb/s balanced In port can be active for E1.

Ethernet Ports

10M/100M Ethernet Ports

Eight RJ-45 connectors are provided, each of which can support 10 Mb/s or 100 Mb/s data rates.

1G Ethernet Ports

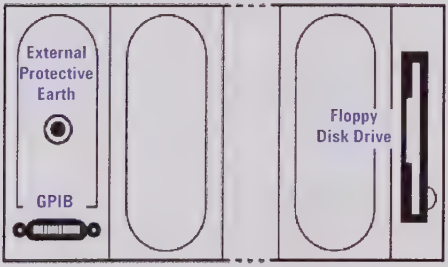
Two Gigabit Interface Convertors (GBICs) are provided as follows:

Instrument Option Number	Ethernet Type	GBIC Agilent Part Number
325	1000BASE-SX (850 nm)	HFBR-5601
326	1000BASE-LX (1310 nm)	HFBR-5611

Tx Eye Clock

SMA connector providing a TX Eye Clock signal that can be used to trigger an oscilloscope when examining data signals.

Left Side Panel Tour



GPIB

Allows test set to be remotely controlled via the GPIB control bus.

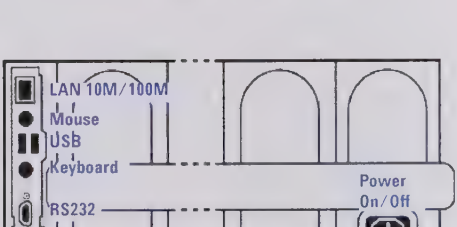
External Protective Earth

Connect an external earth connection to the instrument at this point.

Floppy Disk Drive

Accepts 1.44 MB IBM formatted disks.

Right Side Panel Tour



LAN 10M/100M

10/100 Base-T LAN interface port. Supports remote control of test set and the downloading of firmware upgrades.

10 Base-T LAN Connection Radiated Emissions: To ensure compliance with EN 55011 (1991) a category 5, STP patch lead, RJ45 cable should be used to connect to the LAN port.

Mouse

PS/2 port for connecting a mouse. Activation of this port is planned as a future enhancement, (no timing details available at time of printing).

USB

Two Universal Serial Bus ports for connecting to a Printer.

Keyboard

PS/2 port for connecting an external keyboard. Can be hot-plugged for use at any time. Ensure that keyboard port is used - if connected to mouse PS/2 port in error the instrument will require to be restarted.

RS232

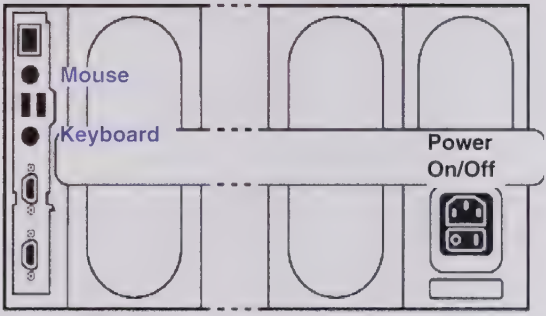
Remote Control port providing following configurations:

- **Controller Type:** Computer and Terminal.
- **Protocol:** None and Xon/Xoff.
- **Speed:** 110, 300, 600, 1200, 2400, 4800, 9600, 19200, 38400 baud.
- **Parity:** Odd, Even, 1s, 0s.
- **Stop Bits:** 1, 2
- **Data Length:** 7 bits.

VGA

Connector for displaying contents of instrument screen on an external display. Ensure that the external display is connected before powering up the instrument.

Using a Mouse and Keyboard



Mouse Port (PS/2) You can use an external mouse (to point and click) instead of the arrows and **<Select>** key to select instrument settings on the display.

Keyboard Port (PS/2) You can use an external keyboard instead of the front panel keypad to enter data. The keyboard can be connected to the instrument at any time.

If you connect the keyboard to the **Mouse Port (PS/2)**, the keyboard will not function. Re-connect the keyboard and mouse to the correct ports, then restart the instrument.

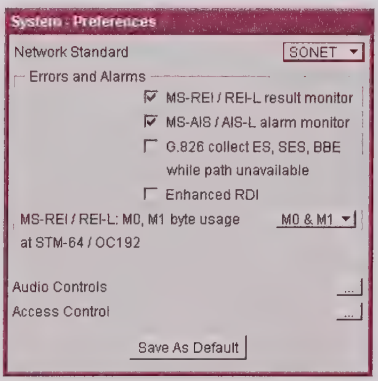
To prevent possible damage the mouse should only be connected and disconnected when the instrument is powered off.

Selecting SONET or SDH Operation

The instrument is a dual standard SONET/SDH instrument. Select the standard you require as follows:

1 Press the **<Menu>** key and select **System > Preferences**.

2 Press **<Select>** to open the Preferences window. Select **SONET** or **SDH** as required.



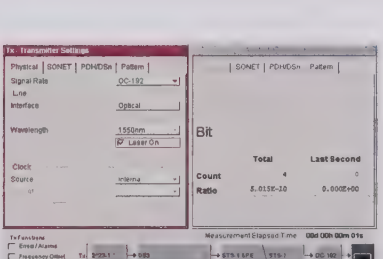
3
Using the Graphical User Interface

Display Windows 38
Menus 40
Basic User Interface Operations 41

The graphical user interface (GUI) with windows, menus and dialogs provides easy access to all the instrument setup, monitoring and results pages together with constant display of context-sensitive help and instrument status. The interface also allows you to use the built-in help system which gives detailed information on using the instrument.

Display Windows

Instrument Windows



Two main instrument windows display the pages for setting up, monitoring and viewing results.

Only one of these windows is active at a time. The active window is indicated by a colored (magenta) border. Change the active window by pressing the **<Window>** button next to the arrow navigation keys.

Move around within a window by using the arrow navigation keys. The current position on the window is shown by a red highlight box around the control field.

The title of the current displayed page is given at the top of the window in the title bar. This also gives the menu name that the page has come from, for example Overhead Setup - Trace Messages is the Trace Messages page selected from Overhead Setup on the menu.

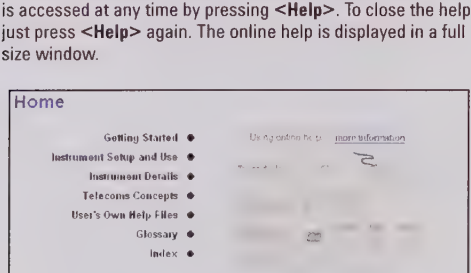
A single line of Context-sensitive help appears at the bottom of the display. This gives you helpful information relating to the area of the screen that is highlighted by the red box.

The Status line displays the instrument and keyboard status.

The Summary window displays the current setup of the Transmitter and Receiver, along with Transmit Function Indicators and the Elapsed Time for the current measurement period. An example of the summary diagram is shown below.

Online Help Window

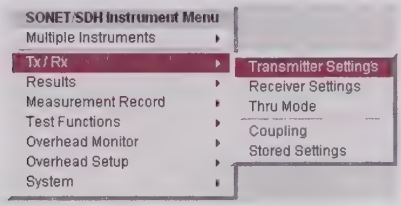
The instrument has a comprehensive built in help system. This is accessed at any time by pressing **<Help>**. To close the help just press **<Help>** again. The online help is displayed in a full size window.



The **<Help>** button toggles the display between the online help and the instrument windows – when you go back into online help it will be in the same page as when you left it. If you want to return to the Home Page of the online help, press the **<Home>** key on the instrument keypad.

Menus

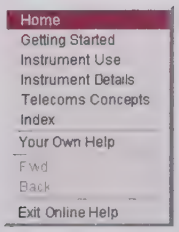
All instrument pages are accessed through the instrument's menu system by selecting an item from the menu. To display the main menu press **<Menu>**.



The focus will be on the first menu item and the submenu will also be displayed. As you move the focus down the menu, the submenu will automatically be displayed.

To select an item from the menu use the up/down arrow navigation buttons to move the focus through the main menu and the left/right arrow navigation buttons to move in and out of the submenus. To select a menu item press **<Select>**.

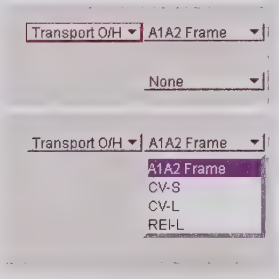
A menu is also available in the online help system to allow you to quickly navigate through the help system and provides quick access to the index and glossary. To display, press **<Menu>**, while in online help.



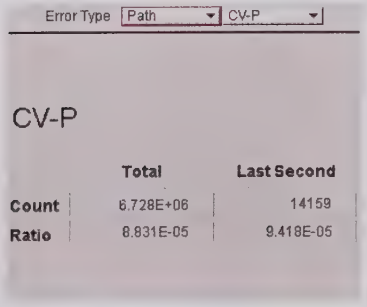
Basic User Interface Operations

To use a

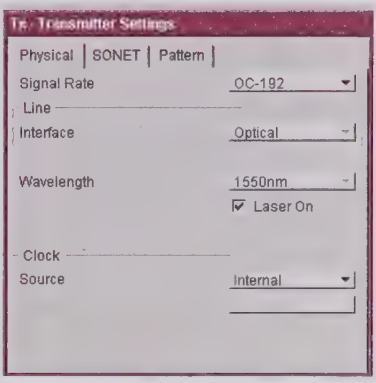
- **Drop down list box** – move the highlight onto the control field and press **<Select>**. Use the arrow navigation buttons to highlight your choice, then press **<Select>**. To close the drop down list without making a selection press **<Cancel>**



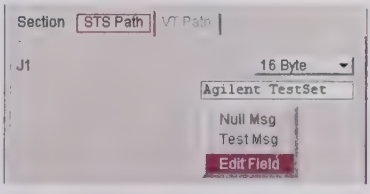
Drop down lists are used where multiple choices are available. For example, in the Errors window you select the **Error Type** from the two drop-down lists.



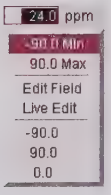
- **Folder/tab selector** – some windows have multiple pages within a window which are separated by the use of folders/tabs. To select a folder/tab move the highlight onto it.



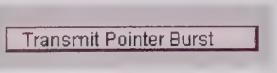
- **Text entry box** – move the highlight onto the control field. For quick text entry use the keypad which will be in text mode. (See "Keypad" on page 20 for details on how to use the keypad to enter text). Press **<Select>** to display a list of presets, **Edit Field** and a list of the most recently used text.



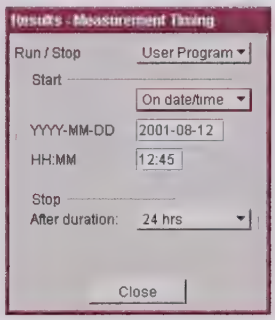
- **Numeric entry box** – move the highlight onto the control field. You can edit values using the keypad, Live Edit or Edit Field. Or you can choose from the preset or most recently-used values listed in the drop down menu. For quick numeric entry, use the keypad to enter the value, then press **<Select>** to save your entry. Alternatively, press **<Select>** to display a drop down list of min/max settings, **Edit Field**, **Live Edit** and a list of the most recently used values for that field.
  Edit Field allows you to select individual digits and edit them using the keypad. This is useful when you want to edit one digit of an eight digit number. Press **<Select>** to enter the value. Each time you enter a new value, the focus moves to the right.
  Live Edit allows you to increment or decrement a value during a measurement, using the arrow navigation keys. Use the left/right arrow keys to highlight the digit to be changed and use the up/down arrow keys to increase or decrease the value.



- **Action Buttons** – These are used to process an action. For example, in Pointer Adjustment, to action a pointer burst you would move the highlight to the **Transmit Pointer Burst** button and press **<Select>**.

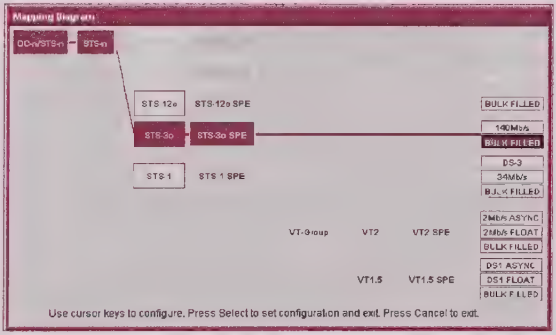


- **Modal window** – a modal window is used when some action is required on certain settings. For example when setting up Measurement Timing - the Measurement Timing modal window will be displayed for you to setup the timing. You must then select **Close** to close the window.
  The **<Cancel>** button can also be used to quickly close the window - please note that this does NOT cancel any changes or settings you have made.

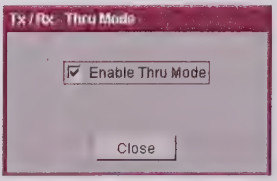


- **More** button – this is indicated by three dots and is used to indicate that there is more information on selections available. To use this move the highlight to the button and press **<Select>**. For example, in the mapping setup area of the **Transmitter Settings** pages, select the **More** button to open the mapping diagram.

- **Mapping Diagram** – this is used to select a mapping structure. Use the arrow navigation keys to select the required mapping. Press **<Select>** when you have finished, or press **<Cancel>** to close the mapping diagram without changing the settings. An example of a mapping diagram is shown below.



- **Checkboxes** – these are used to set a control either OFF or ON. For example, to enable Thru Mode move the highlight to the checkbox and press **<Select>**.



4
Using Online Help

Which Keys Do I Press? 48
Context-Sensitive Help 49
Accessing the Index 49
Adding and Using Your Own Help Files 49

The Online Help provides you with full information on how to set up and use the instrument. A comprehensive index and glossary are included.

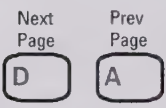
One of the main features of the instrument is the ability to add your own help files. This chapter tells you how to do this.

Which Keys Do I Press?

Press this when you need to refer to the online help. Press it again to take you back to the instrument settings.

Returns you to the Home page.

The **<Back>** and **<Fwd>** keys are used the same way as in a typical Web browser - Use the **<Back>** key to go back to the previous page and, if you have just used the **<Back>** key for navigating then the **<Fwd>** key takes you forward to where you have come from.



These key are used in the same way as Page Up and Page Down on your PC. When there is more information on a page than can be viewed at any one time, use the **<Prev Page>** and **<Next Page>** keys to scroll the display.

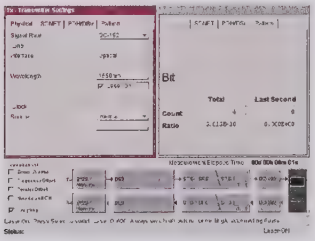
Pressing **<Menu>** displays a drop-down list of the main contents of the online help. Use the Arrow keys to highlight what you want to view, then press **<Select>**.

Most of the pages of online help have several links to more information. The link that is currently active is highlighted. To follow the link, just press the **<Select>** key.

If the link you want to follow is not highlighted, use the **<Arrow Navigation>** buttons to highlight what you want to view, then press **<Select>**

Context-Sensitive Help

A single line of text appears at the bottom of the display. This gives you helpful advice relating to the area of the screen that is highlighted by the red box.



< Context-Sensitive Help Message

Accessing the Index

To find information quickly on a particular topic press **<Menu>** and select **Index** when in Help mode.

Adding and Using Your Own Help Files

One of the benefits of this Transmission Test Set is that you can add your own help files to the instrument and access them through the Online Help system. This may be a useful tool if you wish to store specific instructions for your technicians to carry out routine procedures, help them with problem solving, or detail test procedures that they should follow.

Accessing Your Own Help Files

To access your own help files that you have installed on the instrument, press **<Help>** + **<Menu>** on the instrument panel, and select **Your Own Help**.

The names of your own help files will then be displayed as a list of links. To access a particular file, move the focus on to the link and press **<Select>**.

Create Your Own Help Files

The help files you create to install on the instrument must be in HTML format. You can create them using an HTML editor tool, or with a word processor that will save them as HTML files. When creating your files for online use follow these simple guidelines:

- Use only a sans serif type font (such as Arial) of size 12, 14 or 16 point, Normal or Bold - DO NOT use italic as this font is not supported on the instrument and can cause problems with the presentation of your document.
- Any images you include should be either GIF or JPEG.
- Write several short documents rather than one long one. A long document takes longer to open.
- Design a page size and layout that's appropriate for the size of the instrument display.
- Have all the documents and images in one folder/directory. The instrument does not currently support file tree structures.
- Total size of the files should not be more than 1.44Mb.

The instrument supports HTML Standard 3.2 - presentation or operation of elements using later HTML standards are not guaranteed to operate or display on the instrument.

The following procedure was used to create the example help files that are installed in the instrument - you can view the results on the online help in the 'Users Own Help Files' section.

The example help files can be copied from the instrument and amended for your own use. See "Copy Your Own Help Files to Disk" on page 53.

1 A standard word processor was used to create the content. Keeping your document short, two pages or so, will make it quicker to load and navigate when on the instrument.

2 Save the document as HTML with the file extension html NOT htm.

3 You can open your HTML file in a Web browser to check your converted file.

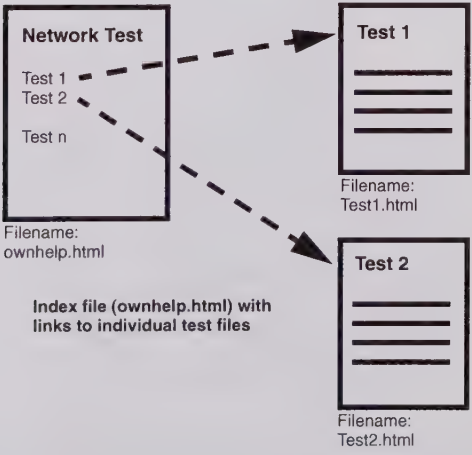
TIP: When saving your files, give them a meaningful name as it is this filename that will appear as a link in the index file online. For example 'AtlantaBasinTest5.html'.

4 When you have finished creating your HTML files you must now create an index file with links to each of your HTML files.

5 To do this, open a new file and create a hypertext link from this file to each of your help files.

6 Save the document as HTML. You must name this index file ownhelp.html. It is important that you use this name as it is used to access your files within the instrument.

7 Copy all of your HTML files, along with any image files that have been created, onto a floppy disk which you now need to install on the instrument.



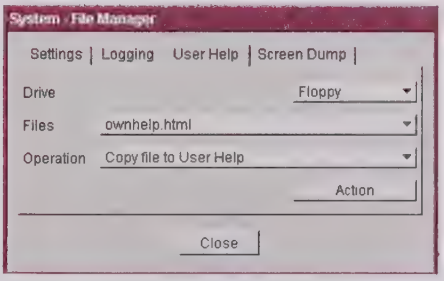
Adding/Updating Your Own Help Files

You can add or update your own help files to the instrument by downloading them from a floppy disk.

Your files must all have the extension html, with images as jpg or gif. Remember, your main index file must be named 'own-help.html' and be loaded into the instrument in order for the links to operate.

1 Insert the floppy disk into the disk drive on the left side of the instrument.

2 Press **<Menu>** and select **System > File Manager.**



3 Select the **User Help** folder as shown above.

4 Set the **Drive** field to **Floppy**.

5 Select the **Operation** field and choose **Refresh List**. Move the focus to the **Action** field and press <Select> to refresh the list of files.

6 Select the Operation field and choose **Copy all files to User Help**.

7 Move the focus to the **Action** button and press **<Select>**. Your files will now be uploaded from the floppy disk to the instrument.

To update files you have already installed in the instrument, repeat the steps 1 to 7, but for step 7 Select the **Operation** field and choose **Copy file to User Help** - you can then select the update file you want to install.

When adding files to the instrument any files with the same name will be overwritten and new files will be added.

8 To check that you can access the files, press **<Help>** + **<Menu>** on the instrument panel, and select **Your Own Help**.

Copy Your Own Help Files to Disk

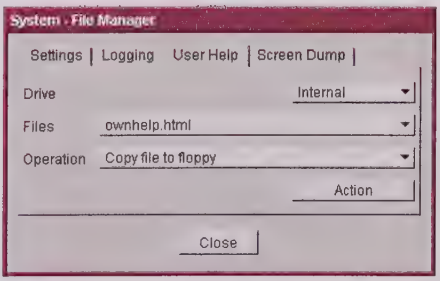
To copy files from the instrument to a floppy disk:

1 Insert a floppy disk into the disk drive on the left side of the instrument.

2 Press **<Menu>** and select **System > File Manager.**

3 Press **<Select>** to open the File Manager window.

4 Select the **User Help** folder as shown.



5 Set the **Drive** field to **Internal**.

6 Select the **Operation** field, press **<Select>** and choose **Refresh List**. Move the focus to the **Action** field and press **<Select>** to refresh the list of files.

7 Select the **Files** field and choose a file.

8 Select the **Operation** field and choose **Copy file to floppy** or **Copy all files to floppy** as required.

9 Move the focus to the **Action** button and press **<Select>**.

Your files will now be downloaded from the instrument to the floppy disk.

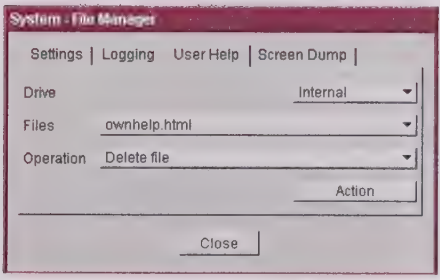
Delete Your Own Help Files

You can use File Manager to delete User Help files stored internally or on a floppy disk.

1 Press **<Menu>** and select **System > File Manager.**

2 Press **<Select>** to open the File Manager window.

3 Select the **User Help** folder as shown.



4 Set the **Drive** field to **Internal** or **Floppy** as required.

5 Select the **Operation** field, press **<Select>** and choose **Refresh List**. Move the focus to the **Action** field and press **<Select>** to refresh the list of files.

6 Select the **Files** field and choose the file you wish to delete.

7 Select the **Operation** field and choose **Delete file** or **Delete all files** as required.

8 To delete the file/files select the **Action** field and press **<Select>**.

5 Using Multiple Instruments

Products Supported 56
Feature Summary 56
Foreground Instrument Selection 57

Products Supported

This product supports multiple instruments, namely:

SONET/SDH	Up to 10 Gb/s line rates T-carrier (DS1/DS3) PDH (2/8/34/140 Mb/s)
Ethernet	2-port 1 Gb/s 8-port 10/100 Mb/s

Feature Summary

- These instruments continue to transmit and receive, and make measurements irrespective of which is the foreground instrument.
- The main menu changes to contain the selections for just the foreground instrument.
- The <Run/Stop> key controls measurements on foreground and background instruments simultaneously.
- The <Smart Test>, <Single Error>, <Show More>, <Reset> and <Print Control> keys operate on the foreground instrument.
- The front panel Signal, Frame, Pattern, Errors, SONET/SDH, DSn, PDH and History LEDs operate only on the foreground instrument.
- The Multiple Instruments LED indicates errors or alarms in all background instruments. If on, check the Multiple Instruments > Status page to locate the problem.
- Trouble Scan/Results Summary operates only on the foreground instrument.
- A Multiple Instruments Status page is available. It is a full product SONET/SDH Trouble Scan and Ethernet Results Summary.

Foreground Instrument Selection

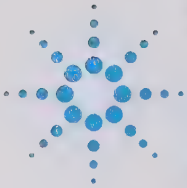
To select the foreground instrument

- Press **<Menu>**, choose **Multiple Instruments > Select** then press **<Select>**. Choose **SONET/DSn (SDH/PDH)** or **Ethernet** then press **<Select>**.

  The name of the selected foreground instrument is shown at the top of the main menu.

  A combined SONET/SDH Trouble Scan and Ethernet Results Summary report is available. Press <Menu>, choose Multiple Instruments > Status then press <Select>.

  A summary of the main features of Multiple Instruments is also available. Press <Menu>, choose Multiple Instruments > Quick Help then press <Select>.



6 Using Smart Test and SignalWizard

Shortcuts to Results, Measurements and Stored Settings 60
Resetting Instrument to Default Settings 60
Using the SignalWizard Test Feature 61
Understanding SignalWizard Overview Window 63

You can use Smart Test to access the SignalWizard feature (when the foreground instrument is set to SONET/SDH) or to the RFC Conformance Tests (when set to Ethernet). It also provides shortcuts to results, measurements and stored settings. Smart Test also allows you to reset the instrument to its default settings.

To access Smart Test features:

- Press **<Smart Test>** then select the appropriate feature from the drop-down menu using the arrows and **<Selects>** keys.

Shortcuts to Results, Measurements and Stored Settings

You can use Smart Test to access results, measurements and stored settings.

To access shortcuts:

1. Press **<Smart Test>**, choose **Shortcuts**. Select an item from the list and press **<Select>**.
2. Select an item from the list of shortcuts.

Resetting Instrument to Default Settings

You can use the Smart Test to reset the instrument to its default values.

To reset instrument to default settings

1. Press **<Smart Test>**, choose **Reset Instrument** then press **<Select>**.
2. Select **OK** in the "Warning" window to reset the instrument settings.

Using the SignalWizard Test Feature

SignalWizard checks the test ports for valid signals. A signal is valid if its power level and frequency are with in the specified limits of the port it is connected to. The line rate and interface level for optical signals is determined along with the termination, signal level and line coding for electrical signals.

SignalWizard then scans all STS/AU channels (up to 192) and selected 'expanded' VT/TU channels simultaneously for error and alarm information. For VT/TU channels that are not 'expanded' in the display, error and alarm information is obtained sequentially (within milliseconds).

SignalWizard can also scan PDH/DSn sub-channels, and shows which channels are unequipped and the type of service being carried by equipped channels.

For information on connecting to a network when testing with SignalWizard, see:

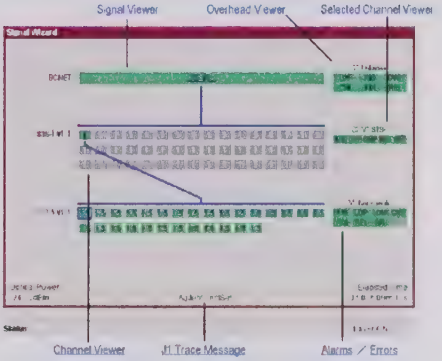
- "In-Service Testing" on page 68
- "Out-of-Service Testing" on page 69

To monitor a signal with SignalWizard:

1 Press **<Smart Test>**, choose **SignalWizard** then press **<Select>**.. A progress indicator is displayed. If more than one valid signal is detected, the port selection window is displayed. Select the port you want to examine, then select **Continue**. If only one valid signal is detected or if the instrument is in Thru-Mode, the Channel Overview window will automatically appear on the display. For information, see "Understanding SignalWizard Overview Window" on page 63.

If SignalWizard detects a DSn/PDH signal, then **PDH/DSn Channel Scan** will automatically be launched. A window will appear showing the status and structure of all channels.

If no valid signal is detected, you can re-scan the ports or return to the main instrument.



2 Press **<Menu>** to further investigate channels, errors or path trace messages (select **Next Error**, **Previous Error**, **Expand** or **Collapse**). If any STS/AU contains VT/TU tributaries, you can view a tributary in more detail. Select the channel, press **<Menu>**, then select **Expand**.

For information on path trace messages, see "Monitoring Path Trace Messages" on page 66.

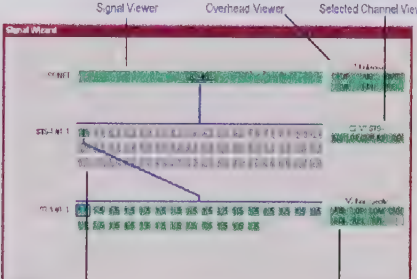
3 To close SignalWizard, do one of the following:

Press **<Smart Test>**, choose **Stop Wizard** then press **<Select>**.

Press **<Menu>**, choose **Exit** then press **<Select>**.

Before closing SignalWizard, you can automatically configure the transmitter and/or receiver settings to match the signal being applied to the instrument (not available in Thru mode). This feature is useful if you intend doing further testing. It saves you from having to manually configure the instrument settings.

Understanding SignalWizard Overview Window



Signal Viewer

Displays the detected signal. If a J0 trace message is detected this is also displayed (both 16- and 64-byte message formats are supported).

Overhead Viewer

Displays results information associated with the overhead layer of the signal, including:

- Synchronization status message (decoded S1 byte)
- CV-S (RS-BIP), CV-L (MS-BIP) and REI-L (MS-REI) error status
- AIS-L (MS-AIS) and RDI-L (MS-RDI) alarm status

(LOS and LOF alarms are displayed on the instrument's front panel LEDs.)

Selected Channel Viewer

Displays result information associated with the selected channel, including:

- Type of payload (traffic) being carried in the channel (decoded C2 byte)
- CV-P (HP-BIP) and REI-P (HP-REI) error status
- AIS-P (AU-AIS), LOP-P (AU-LOP) and RDI-P (HP-RDI) alarm status
- Indicator for detected pointer adjustments

J1 Trace Message

Displays the decode path trace message associated with the selected channel. Both 16- and 64-byte messages formats are supported.

Channel Viewer

The Overview window shows a summary (using color coding, see the following table) of the results for all channels. Each channel detected in the signal is provided with a dedicated box that summarizes the channel status. A channel carrying VT/TU channels is highlighted by its size designator being underlined. Broadband mappings are not underlined.

The size designator displayed within each box. While any non-standard concatenated channels will be detected and displayed, no errors or alarms are reported for that channel. Unequipped channels are displayed on a grey background.

Pointer activity within a channel is indicated by the channel background flashing blue.

Color Coding		Result
Green		No Errors/Alarms detected during test or since the last history reset
Red		Errors/Alarms detected
Yellow		History (Errors/Alarms detected in the past)
Red/white A		AIS (STS-1, STS-3c/STM-0, STM-1)
Blue		Pointer Move
Grey		Unequipped
White/black dot		Other Standard
Black		Illegal Pointer Combination

Errors

An Error flag is raised when one or more errors occur in any one sampling period.

Alarms

An Alarm flag is raised when one or more alarms occur in any one sampling period.

- Loss of Pointer LOP
- Path AIS (AIS-P)
- Remote Path Alarm (RDI-P)
- Pointer Adjustment LOP (LOP flashes blue on each adjustment)

Monitoring Path Trace Messages

When running SignalWizard any routing errors in the network will be shown in the Overview window.

During the installation and commissioning of new services, or troubleshooting, the ability to generate and monitor path trace messages is essential. This allows you to confirm correct routing paths through network equipment with software controlled routing capability. You can also use path trace messages for checking routing performance of network elements during protection switching to confirm the correct signals have been protected in fault conditions.

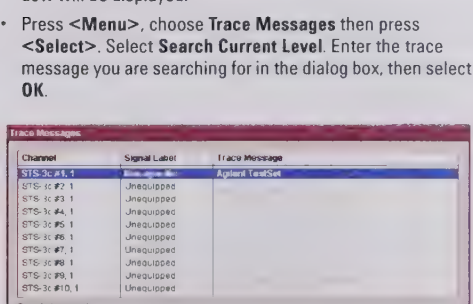
You can view all the J1 path trace messages for the received signal at the same time. Alternatively, you can view all the J2 path trace messages associated with VT/TU channels in a selected STS/AU.

To view path trace messages:

- Use the arrow keys to select the STS/AU channel of interest. View the J1 path trace message at the bottom of the display.

To list/search all J1 Path trace messages in the receive signal:

- Press **<Menu>**, choose **Trace Messages** then press **<Select>**. Select **List Current Levels**, a trace message window will be displayed.
- Press **<Menu>**, choose **Trace Messages** then press **<Select>**. Select **Search Current Level**. Enter the trace message you are searching for in the dialog box, then select **OK**.



To view J2 Path trace messages in VT/TU channel:

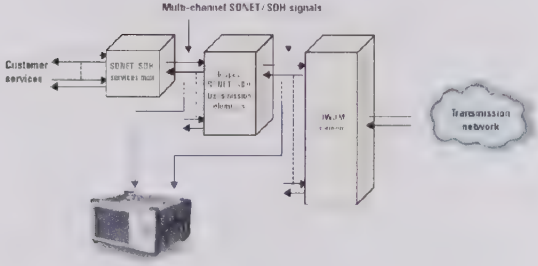
1. Use the arrows to highlight the channel for further analysis.
2. Press **<Menu>**, choose **Expand** then press **<Select>**. This expands the VT/TU substructure.
3. Press **<Menu>**, choose **Collapse** then press **<Select>**. This closes the VT/TU substructure.

STS/AU channels that contain VT/TU channels are shown underlined on the display.

In-Service Testing

You can use SignalWizard to simultaneously monitor all channels in the received signal. This feature is useful when commissioning new transmission systems or performing routine maintenance checks.

A typical in-service network test connection is shown below.

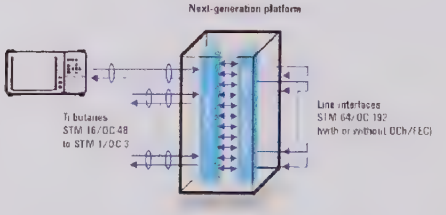


Out-of-Service Testing

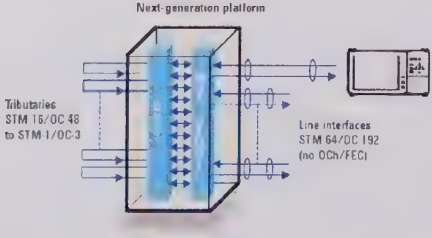
You can use the instrument transmitter in conjunction with SignalWizard all channel test feature to test each path carried within a tributary or line signal. You can apply the test signal to the tributary or line side of the network element.

Applying a test signal to the line side of the network element may reduce the number of ports that need to be checked. SignalWizard will identify the type of network paths present in the received signal (including the mix of channel types), and the traffic carrying status of each channel (showing which are equipped).

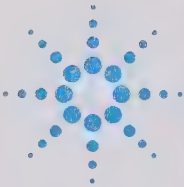
Typical tributary and line network test connections are shown below.



Tributary-Side Testing Setup



Line-Side Testing Setup



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Hints and Tips

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Avoiding Problems When Making Measurements

Bit errors can occur due to network defects (such as faulty network elements, damaged optical fiber or dust/dirt particles in the fiber connections) or problems with the test environment/setup. Follow the steps below to avoid problems when making measurements.

To avoid introducing errors when performing tests:

- Ensure that optical fibres connecting the instrument to the network are not damaged - check that fibres have not been crimped.
- Avoid acute bends in the fibre. Ensure that fibres only have gentle arcs.
- If the instrument is left unattended for a long term test, ensure that the equipment is not in a position where people will disturb the connecting fibers.
- Ensure that all fiber connections are clean and dirt-free. Use a fiberscope to measure the cleanliness of a (unpowered) fiber. A poorly cleaned fiber results in a drop in power. Alternatively, use a power meter (e.g. the instrument's internal power meter) to measure the power at the end of a fiber, the other end of which is connected to the network.
- Before connection is made, always clean the connector ferrule tip with acetone or alcohol using a cotton swab. Dry the connector with compressed air. Failure to maintain cleanliness of connectors is liable to cause excessive insertion loss.
- Ensure that the correct time and date is set on the instrument.

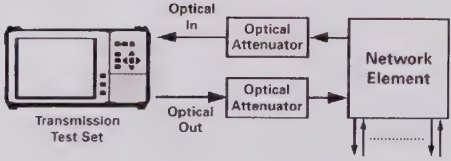
Avoiding Optical Receiver Overload

Check when connecting an optical transmitter to an optical receiver that you do not overload the receiver. This applies to elements under test and also the instrument receiver input ports.

On the instrument connector panel the following output/input power level information is printed:

Tx Optical Out ports: Maximum available output power (color - black).

Rx Optical In ports: Maximum input power (damage level) the receiver input can accept before damage occurs (color - yellow).
Recommended input power operating range for signals applied to the receiver (color - green).



When performing tests, it is recommended that you drive the optical receiver with a signal that has an average power in the middle of the receiver's operating range (mid-way between the upper and lower levels printed next to the Optical In port).

Cleaning Optical Connectors

You should clean the optical connectors at regular intervals using the following materials:

Description	Agilent Part Number
Compressed Air Can or Blow Brush	
Isopropyl Alcohol	8500-5344
Lens Cleaning Paper	9300-0761
Swabs	5080-5400

Do not insert any tool or object into the optical IN or OUT ports of the instrument as damage to or contamination of the optical fiber may result.

1. Disconnect the instrument from the Power Line or switch off the laser transmitter before commencing this cleaning procedure.
2. Remove the adapters from the optical IN and OUT ports by flipping back the lever on the optical adapter.
3. Using the blow brush with the brush removed blow through the ferrule of the standard flexible connector and the adapter.
4. If the optical fibre of the fixed connector requires further cleaning this entails disassembly of the module. This should be carried out only by suitably trained service personnel.
5. Apply some isopropyl alcohol to a piece of the cleaning paper and clean the barrel of the adapter. Using a new piece of cleaning paper, clean the face of the adapter. Repeat this operation, using a new piece of cleaning paper each time.
6. Use a blow brush or compressed air to remove any particles of cleaning paper which may be present.
7. Replace the adapters in the optical connector. Secure in place by clicking the retaining lever back into position.

Front Panel Soft Recovery (Cold Start)

An instrument "cold start" routine is provided to reset the instrument in the event of an unplanned hardware or firmware event. AA cold start reboots the instrument and restarts the instrument using a default configuration file. Performing a cold start erases existing configuration information.

Performing a Cold Start

1. Switch the instrument off and wait a few seconds.
2. Switch the instrument on and as the instrument boots up, look carefully at the display.
3. Wait for the "Starting instrument" . . . . . text to be displayed. After a few seconds start to repeatedly press the **<Menu>** key until the Agilent splash screen appears with an options menu in the top left corner of the display.

   The following options are available:

   1 Reload configuration.

   3 Cold start.

   5 Normal start.

   6 Upgrade software.
4. Press 3 on the numeric keypad to select cold start.
5. The unit will then continue with the boot up process.
6. When the boot-up procedure is complete, the instrument displays a dialog box with the message

   "Instrument reset to default settings."

8
Quick Reference Tables

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Only the main selections are listed here. It is assumed that the user understands that once a field is selected that the front panel **<Select>** button is then pressed to make the selection or to open the window.

Introduction

Use the front panel **<Smart Test>** and **<Print Control>** buttons for fast selection of SignalWizard, Ethernet RFC 2544 conformance tests, Measurements and Print Control functions. Use the **<Menu>** key to access all other functions.

Smart Test

You can use the front panel **<Smart Test>** button to quickly select one of the following:

Function – Using Smart Test	Path
SignalWizard	With SONET/SDH as Foreground instrument: Press **<Smart Test>**, choose **SignalWizard** then press **<Select>**.
Ethernet RFC 2544 conformance tests	With Ethernet as Foreground instrument: Press **<Smart Test>**, choose **RFC 2544 Test & Results** then press **<Select>**.
Shortcuts to frequently-used features	Press **<Smart Test>**, choose **Shortcuts**. Select an item from the list and press **<Select>**.
Reset Instrument to default settings.	Press **<Smart Test>**, choose **Reset Instrument** then press **<Select>**.

Print Control

Function – Print Control	Path
Copy a snapshot of the logging results to a Printer/File	Press **<Menu>**, choose **System > Measurement Logging** then press **<Select>**.
Copy a screen dump of current window to a file or Printer	Press **<Print Control>**, choose **Destination**, **Printer** or **File**

Multiple Instruments

Function – Multiple Instruments	Path
Select Foreground instrument	Press **<Menu>**, choose **Multiple Instruments > Select** then press **<Select>**. Choose **SONET/DSn (SDH/PDH)** or **Ethernet** then press **<Select>**.
View Status report for Foreground and Background instruments	Press **<Menu>**, choose **Multiple Instruments > Status** then press **<Select>**.
View Multiple Instruments Quick Help page	Press **<Menu>**, choose **Multiple Instruments > Quick Help** then press **<Select>**.

SONET/SDH Transmitter Functions

Function – Transmitter Interface	Path
Setting the Transmit Interface	Press **<Menu>**, choose **Tx/Rx** > **Transmitter Settings** then press **<Select>**.
Setting Tx Signal Rate, Interface, Code, Operating Level (SONET/SDH, PDH and DSn)	Press **<Menu>**, choose **Tx/Rx** > **Transmitter Settings** then press **<Select>**. Select the **Physical** tab.
Setting Tx Mapping (concatenated and TU/VT)	Press **<Menu>**, choose **Tx/Rx** > **Transmitter Settings** then press **<Select>**. Then select **SDH/SONET**.
Inserting 2 Mb/s or DS1 into SDH or SONET signal	Press **<Menu>**, choose **Tx/Rx** > **Transmitter Settings** then press **<Select>**. Then select **SDH/SONET**.
Setting Tx PDH/DSn framing, test channel and background settings	Press **<Menu>**, choose **Tx/Rx** > **Transmitter Settings** then press **<Select>**. Then select **PDH/DSn**.
Inserting 2 Mb/s or DS1 into PDH or DSn signal	Press **<Menu>**, choose **Tx/Rx** > **Transmitter Settings** then press **<Select>**. Then select **PDH/DSn**.
Setting Tx test pattern	Press **<Menu>**, choose **Tx/Rx** > **Transmitter Settings** then press **<Select>**. Then select **Pattern**.

Function – Transmitter Interface	Path
Setting TCM in the Transmitter (SDH only)	Press **<Menu>**, choose **Tx/Rx** > **Transmitter Settings** then press **<Select>**. Then select **SDH**.
Setting Thru Mode	Press **<Menu>**, choose **Tx/Rx > Thru Mode** then press **<Select>**.
Coupling Transmit and Receive Settings	Press **<Menu>**, choose **Tx/Rx > Coupling** then press **<Select>**.
Recall or Save instrument configuration	Press **<Menu>**, choose **Tx/Rx > Stored Settings** then press **<Select>**.

SONET/SDH Receiver Functions

Function – Receiver Interface	Path
Setting the Receiver Interface	Press **<Menu>**, choose **Tx/Rx** > **Receiver Settings** then press **<Select>**.
Setting Rx Signal Rate, Interface, Code, Operating Level (SONET/SDH, PDH and DSn)	Press **<Menu>**, choose **Tx/Rx > Receiver Settings** then press **<Select>**. Select the **Physical** tab.
Setting Rx Mapping (concatenated and TU/VT)	Press **<Menu>**, choose **Tx/Rx** > **Receiver Settings** then press **<Select>**. Then select **SDH/SONET**.
Dropping 2 Mb/s or DS1 from SDH or SONET signal	Press **<Menu>**, choose **Tx/Rx** > **Receiver Settings** then press **<Select>**. Then select **SDH/SONET**.
Setting Rx PDH/DSn framing, test channel and background settings	Press **<Menu>**, choose **Tx/Rx** > **Receiver Settings** then press **<Select>**. Then select **PDH/DSn**.
Dropping 2 Mb/s or DS1 into PDH or DSn signal	Press **<Menu>**, choose **Tx/Rx** > **Receiver Settings** then press **<Select>**. Then select **PDH/DSn**.
Setting Tandem Connection Monitoring (SDH only)	Press **<Menu>**, choose **Tx/Rx** > **Receiver Settings** then press **<Select>**. Then select **SDH**.

Function – Receiver Interface	Path
Setting Rx test pattern	Press **<Menu>**, choose **Tx/Rx > Receiver Settings** then press **<Select>**. Then select **Pattern**.
Using Smart Test shortcuts	Press **<Smart Test>**, choose **Shortcuts**. Select an item from the list and press **<Select>**.
Using SignalWizard	Press **<Smart Test>**, choose **SignalWizard** then press **<Select>**.
Coupling Receive and Transmit Settings	Press **<Menu>**, choose **Tx/Rx > Coupling** then press **<Select>**.
Recall or Save instrument configuration	Press **<Menu>**, choose **Tx/Rx > Stored Settings** then press **<Select>**.

SONET/SDH Overhead Setup

Function – Selecting Transmitter Overhead	Path
Setting Transmit Overhead Setup	Press **<Menu>**, choose **Overhead Monitor > Trace Messages** then press **<Select>**. Select the required tab.
Setting Tx Overhead Trace Messages	Press **<Menu>**, choose **Overhead Setup > Trace Messages** then press **<Select>**.
Setting Tx Overhead Labels (Signal Labels, Sync Status)	Press **<Menu>**, choose **Overhead Setup > Labels** then press **<Select>**.
Setting Tx Overhead APS Messages	Press **<Menu>**, choose **Overhead Setup > APS Messages** then press **<Select>**.
Setting Tx Overhead H4 Sequence	Press **<Menu>**, choose **Overhead Setup > H4 Sequence** then press **<Select>**.
Setting Tx Overhead Bytes	Press **<Menu>**, choose **Overhead Setup > Byte Setup** then press **<Select>**.
Setting Tx DS3 FEAC	Press **<Menu>**, choose **Overhead Setup > DS3 FEAC** then press **<Select>**.
Setting Tx DS1 Loopcodes	Press **<Menu>**, choose **Overhead Setup > DS1 Loopcodes** then press **<Select>**.

Function – Selecting Transmitter Overhead	Path
Setting Tx Spare Bits	Press **<Menu>**, choose **Overhead Setup > Spare Bits** then press **<Select>**.
Setting Tx Signaling Bits	Press **<Menu>**, choose **Overhead Setup > Signaling Bits** then press **<Select>**.
Restore Byte Default values	Press **<Menu>**, choose **Overhead Setup > Restore Defaults** then press **<Select>**.

SONET/SDH Overhead Monitor

Function – Selecting Receiver Overhead Monitor	Path
Using Rx Overhead Monitor	Press **<Menu>**, choose **Overhead Monitor > Trace Messages** then press **<Select>**. Select the required tab.
Using Rx Overhead Monitor Trace Messages	Press **<Menu>**, choose **Overhead Monitor > Trace Messages** then press **<Select>**.
Using Rx Overhead Monitor Labels (Signal Labels, Sync Status)	Press **<Menu>**, choose **Overhead Monitor > Labels** then press **<Select>**.
Using Rx Overhead Monitor APS Messages	Press **<Menu>**, choose **Overhead Monitor > APS Messages** then press **<Select>**.
Setting Rx Overhead Monitor H4 Sequence	Press **<Menu>**, choose **Overhead Monitor > H4 Sequence** then press **<Select>**.
Using Rx Overhead Monitor Bytes	Press **<Menu>**, choose **Overhead Monitor > Byte Monitor** then press **<Select>**.
Setting Rx DS3 FEAC	Press **<Menu>**, choose **Overhead Monitor > DS3 FEAC** then press **<Select>**.

Function – Selecting Receiver Overhead Monitor	Path
Setting Rx DS1 Loopcodes	Press **<Menu>**, choose **Overhead Monitor > DS1 Loopcodes** then press **<Select>**.
Setting Rx Spare Bits	Press **<Menu>**, choose **Overhead Monitor > Spare Bits** then press **<Select>**.
Setting Rx Signaling Bits	Press **<Menu>**, choose **Overhead Monitor > Signaling Bits** then press **<Select>**.
Setting Rx Sa Bits	Press **<Menu>**, choose **Overhead Monitor > Sa Bits** then press **<Select>**.

SONET/SDH Results

Function – Results and Measurement Timing	Path
View Trouble Scan Result	Press **<Menu>**, choose **Results > Trouble Scan** then press **<Select>**.
Select Measurement Timing	Press **<Menu>**, choose **Results > Measurement Timing** then press **<Select>**.
View Alarm Seconds	Press **<Menu>**, choose **Results > Alarm Seconds** then press **<Select>**.
View Measurement Error Summary	Press **<Menu>**, choose **Results > Error Summary** then press **<Select>**.
View Measurement Errors	Press **<Menu>**, choose **Results > Errors** then press **<Select>**.
View Performance Analysis	Press **<Menu>**, choose **Results > Performance Analysis** then press **<Select>**.
View Pointer Activity	Press **<Menu>**, choose **Results > Network Measurements** then press **<Select>**. Select the **Pointers** tab.
View Service Disruption	Press **<Menu>**, choose **Results > Network Measurements** then press **<Select>**. Select the **Service Disruption** tab.
Measure Round Trip Delay	Press **<Menu>**, choose **Results > Network Measurements** then press **<Select>**. Select the **Round Trip Delay** tab.

Function – Results and Measurement Timing	Path
Measure Frequency	Press **<Menu>**, choose **Results > Signal Quality** then press **<Select>**. Select the **Frequency** tab.
Measure Optical Power	Press **<Menu>**, choose **Results > Signal Quality** then press **<Select>**. Select the **Optical Power** tab.
Measure Pulse mask	Press **<Menu>**, choose **Results > Signal Quality** then press **<Select>**. Select the **Pulse Mask** tab.
View graph of Pointer movement	Press **<Menu>**, choose **Measurement Record > Graph Manager** then press **<Select>**.

SONET/SDH Test Functions

Function – Test Functions	Path
Adding Errors and Alarms to the transmit signal	Press **<Menu>**, choose **Test Functions > Errors and Alarms** then press **<Select>**.
Adding Frequency Offset to the transmitted line signal	Press **<Menu>**, choose **Test Functions > Frequency Offset** then press **<Select>**.
Adding Pointer Adjustments	Press **<Menu>**, choose **Test Functions > Pointer Adjustment** then press **<Select>**.
Inserting/Dropping Data Communications Channel	Press **<Menu>**, choose **Test Functions > DCC Drop/Insert** then press **<Select>**.
Perform instrument Self Test	Press **<Menu>**, choose **System > Self Test** then press **<Select>**.
Switch off Test Functions	Press **<Menu>**, choose **Test Functions > Switch Off** then press **<Select>**.

Ethernet Functions

Function – Ethernet	Path
Set the Transceiver	Press **<Menu>**, choose **Tx/Rx > Transceiver Settings** then press **<Select>**.
Couple Transceiver to Run/Stop key	Press **<Menu>**, choose **Tx/Rx > Transceiver Coupling** then press **<Select>**.
Select Tx Eye Clock rate	Press **<Menu>**, choose **Tx/Rx > Tx Eye Clock** then press **<Select>**.
Recall or Save instrument configuration	Press **<Menu>**, choose **Tx/Rx > Stored Settings** then press **<Select>**.
View Results Summary	Press **<Menu>**, choose **Test Functions & Results > Results Summary** then press **<Select>**.
Select Measurement Timing	Press **<Menu>**, choose **Test Functions & Results > Measurement Timing** then press **<Select>**.
Set up manual tests	Press **<Menu>**, choose **Test Functions & Results > Manual Tests & Results** then press **<Select>**.
Set up RFC 2544 conformance tests	Press **<Menu>**, choose **Test Functions & Results > RFC2544 Tests & Results** then press **<Select>**.
Capture frames	Press **<Menu>**, choose **Frame Capture** then press **<Select>**.

Function – Remote Control, Date/Time, Preferences and Calibration	Path
View System Options and Software Revision	Press **<Menu>**, choose **System > Options** then press **<Select>**.
Select Network Standard (SDH or SONET) MS-REI/REI-L byte usage selection MS-REI/REI-L result monitor selection MS-AIS/AIS-L alarm monitor selection G.826 collect ES, SES, BBE enable Enhanced RDI enable SignalWizard: Labelling Laser Off on power-up STS-1 numbering Save System Preferences settings as default	Press **<Menu>**, choose **System > Preferences** then press **<Select>**.
Audio Controls, Beep on Error, Key Click	Press **<Menu>**, choose **System > Audio Controls** then press **<Select>**.
Set up remote operation via LAN, GPIB, RS-232 or Modem	Press **<Menu>**, choose **System > Remote Control** then press **<Select>**.
Setting Time and Date	Press **<Menu>**, choose **System > Time and Date** then press **<Select>**.
Calibrate instrument	Press **<Menu>**, choose **System > Calibration** then press **<Select>**.

System Functions – Measurement Logging

Function – Measurement Logging	Path
Set up Logging conditions (when, and results selection)	Press **<Menu>**, choose **System > Measurement Logging** then press **<Select>**. Select **Enable Logging**.
Log results to File or Printer	Press **<Menu>**, choose **System > Measurement Logging** then press **<Select>**. Select **Destination** - **File** or **Printer**.
Set up Logging Interval Report	Press **<Menu>**, choose **System > Measurement Logging** then press **<Select>**. Select **Interval Report**.
Select Logged Events	Press **<Menu>**, choose **System > Measurement Logging** then press **<Select>**. Select the required **Logged Events** tabs.
Select Logged Reports	Press **<Menu>**, choose **System > Measurement Logging** then press **<Select>**. Select the required **Logged Reports** tabs.

System Functions – File Manager

Function – File Manager	Path
Copy/delete logging files to floppy disk drive (A:)	Press **<Menu>**, choose **System > File Manager** then press **<Select>**. Select the **Logging** tab. Select **Drive** > **Internal**.
Copy to or get Screen Dumps from floppy disk drive (A:)	Press **<Menu>**, choose **System > File Manager** then press **<Select>**. Select the **Screen Dump** tab.
Copy to or get Stored Settings from floppy disk drive (A:)	Press **<Menu>**, choose **System > File Manager** then press **<Select>**. Select the **Settings** tab.
Copy to or get your own User Help files from floppy disk.	Press **<Menu>**, choose **System > File Manager** then press **<Select>**. Select the **User Help** tab.

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In this book

This book is a quick reminder of how to use the Transmission Test Sets. It is aimed at both new and experienced users.

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